



Search

[Return to Search Results](#)

My Tools ▾

[Search History](#)[Marked List](#)[Look Up Full Text](#)[Save to EndNote online](#)[Add to Marked List](#)

1 of 1

PROBABILISTIC MODEL OF LASER RANGE FINDER FOR THREE DIMENSIONAL GRID CELL IN CLOSE RANGE ENVIRONMENT

By: [Iman, H](#) (Iman, Hafiz)^[1]; [Rashid, NKAM](#) (Rashid, Nahrul Khair Alang Md)^[1]

IIUM ENGINEERING JOURNAL

Volume: 17 Issue: 1 Pages: 63-82

Published: 2016

Abstract

The probabilistic model of a laser scanner presents an important aspect for simultaneous localization and map-building (SLAM). However, the characteristic of the beam of the laser range finder under extreme incident angles approaching 90° has not been thoroughly investigated. This research paper reports the characteristic of the density of the range value coming from a laser range finder under close range circumstances where the laser is imposed with a high incident angle. The laser was placed in a controlled environment consisting of walls at a close range and 1000 iteration of scans was collected. The assumption of normal density of the metrical data collapses when the beam traverses across sharp edges in this environment. The data collected also shows multimodal density at instances where the range has discontinuity. The standard deviation of the laser range finder is reported to average at 10.54 mm, with 0.96 of accuracy. This significance suggests that under extreme incident angles, a laser range finder reading behaves differently compared to normal distribution. The use of this information is crucial for SLAM activity in enclosed environments such as inside piping grid or other cluttered environments.

Keywords

Author Keywords: [Hokuyo UTM-30LX](#); [Kernel density estimation](#); [Probabilistic model](#)

Author Information

Reprint Address: Iman, H (reprint author)

Int Islamic Univ Malaysia, Fac Engr, Dept Mechatron Engr, Jalan Gombak, Kuala Lumpur
53100, Malaysia.

Addresses:

[1] Int Islamic Univ Malaysia, Fac Engr, Dept Mechatron Engr, Jalan Gombak, Kuala Lumpur
53100, Malaysia

E-mail Addresses: hafiz.ghazman@gmail.com; nahrul@iium.edu.my

Publisher

INT ISLAMIC UNIV MALAYSIA, KULLIYAH MEDICINE, JALAN SULTAN AHMAD SHAH, KUANTAN
PAHAN, 25200, MALAYSIA

Categories / Classification

Research Areas: Engineering

Web of Science Categories: Engineering, Multidisciplinary

Document Information

Document Type: Article

Citation Network

0 Times Cited

14 Cited References

[View Related Records](#)

[View Citation Map](#)

[Create Citation Alert](#)

(data from Web of Science™ Core Collection)

All Times Cited Counts

0 in All Databases

0 in Web of Science Core Collection

0 in BIOSIS Citation Index

0 in Chinese Science Citation
Database

0 in Data Citation Index

0 in Russian Science Citation Index

0 in SciELO Citation Index

Usage Count

Last 180 Days: 0

Since 2013: 0

[Learn more](#)

This record is from:

Web of Science™ Core Collection

Suggest a correction

If you would like to improve the quality of the data in this record, please [suggest a correction](#).